

What is rosin-core solder?

Rosin-core solder is commonly used by workers in many industries to make electrical connections. It is a wire product that is manufactured from tin/lead or tin/antimony alloy, with rosin-based flux making up the inside core of the wire. Soldering is accomplished by heating the two items to be connected with a soldering iron, and touching the heated points with the solder, which melts, flows, and solidifies to form a permanent connection. The purpose of the rosin flux is to prevent oxidation and ensure a secure bond.



Why is rosin-core solder considered a health hazard?

When rosin-core solder wire is heated by a soldering iron, fumes are produced that contain various chemicals. Inhalation of these solder flux fumes can cause asthma or aggravate existing asthma, unless measures are taken to prevent exposure. The fumes can also cause irritation of the upper respiratory tract and the eyes, and skin contact with rosin flux can cause dermatitis. The highest risk of exposure to fumes occurs during hand soldering, because the solderer's head is likely to be near or in the path of the fumes rising from the soldering iron. Co-workers in the vicinity of uncontrolled rosin flux fumes may also be at risk of exposure.

The New Jersey Work-Related Asthma Surveillance and Intervention Project has identified 11 workers (1990-2008) who have developed work-related asthma as a result of exposure to rosin flux fumes.

● Here is what happened to one solderer:

An assembly line worker began having breathing problems while working at a scientific lamp manufacturing plant. She used rosin-core solder to connect wires to the lamps. Although there was a local exhaust ventilation system, it was not being used properly and the solder fumes were inhaled by the worker. This worker was diagnosed with work-related asthma. She and the other solderers were trained to use the ventilation system correctly to prevent breathing in the fumes. Her asthma attacks have stopped since she was no longer exposed to the solder flux fumes.

What are some warning signs?

Once asthma has developed, even small exposures to rosin-core solder fumes or other chemicals can lead to asthma attacks. These attacks can occur instantly or be delayed for several hours. When fully developed, this health condition is irreversible.

Early symptoms of fume exposure can include:

- watering, irritated eyes
- runny or stuffy nose
- sore throat
- coughing, wheezing, chest tightness, and breathlessness

These symptoms are not normal. If you have any of these symptoms when you're exposed to rosin-core solder fume, tell your employer and your doctor. Your employer can ensure that exposure controls are in place and effective, and your doctor can treat your asthma.



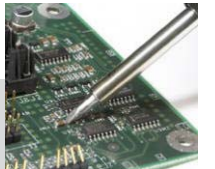
Who can be affected?

Workers performing the following tasks and processes are potentially exposed to rosin-core solder flux fumes:

- electronic and electrical assembly and rework
- repair of telecommunications equipment, HVAC units, and domestic appliances
- desoldering (common in recycling)

How can exposure to rosin-core solder fumes be controlled?

The best way to control exposure to solder flux fumes, as well as lead fumes, is to use a local exhaust ventilation (LEV) system. An LEV system works like a vacuum cleaner to suck in fumes at the point where they are created, and exhaust the fumes to the outside or through a special filtration system. Various types of LEV systems for soldering are available, including a hood on a flexible duct, an extractor built into the tip of the soldering iron, and a ventilated cabinet in which the soldering is performed. When used correctly, an



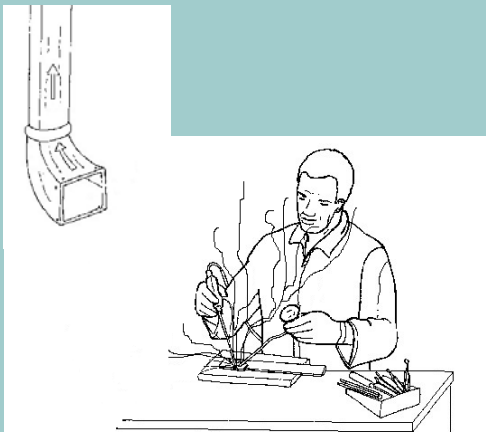
● TIPS

- ✓ **Confirm that the ventilation system is turned on and working properly.**
- ✓ **Use soldering irons at the lowest temperature possible for an acceptable joint.**

LEV system will effectively prevent the inhalation of solder flux fumes (See diagram below).

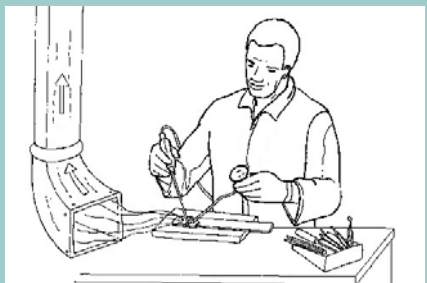
A small fan directed at the workpiece can reduce fume exposure, but is less effective than an LEV system because the fumes are not removed from the workroom air.

BAD



Although working, the local exhaust ventilation is incorrectly placed, leaving the worker exposed to the solder fumes.

GOOD



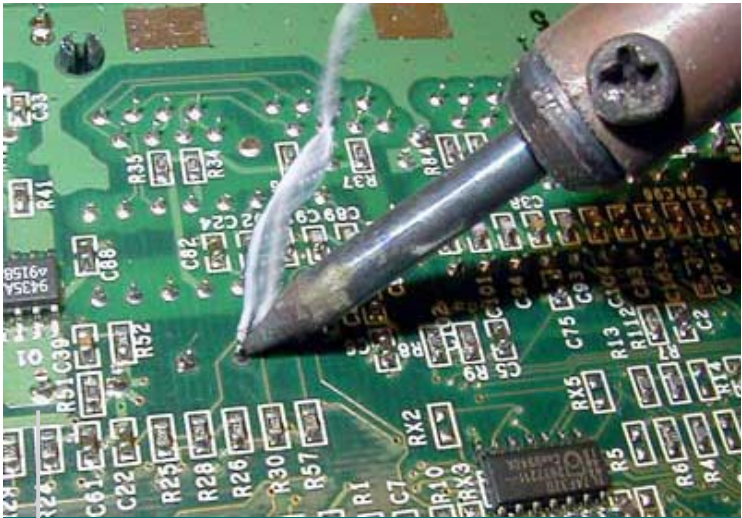
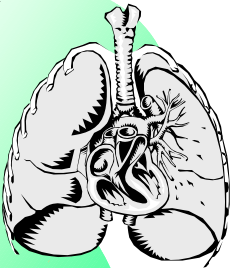
The local exhaust ventilation is removing the fumes at the source.

How can I get more information?

NJ Department of Health & Senior Services
Occupational Health Surveillance Program
PO Box 360
Trenton, NJ 08625-0360
Phone: (609) 984-1863
Fax: (609) 292-5677
Internet: www.nj.gov/health/surv

Protect
your lungs now!

Avoid breathing problems
for the rest of your life.



Asthma and Rosin-Core Solder

- What You Need to Know

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Division of Epidemiology, Environmental and Occupational Health
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